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UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/038,787	12/31/2001	Peter L. Doyle	42390.P11486	4083

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EXAMINER
CASCHERA, ANTONIO A

ART UNIT	PAPER NUMBER
2697	4

DATE MAILED: 09/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.		Applicant(s)
Office Action Summary	10/038,787		DOYLE, PETER L.
	Examiner		**Art Unit**
	Antonio A Caschera		2697

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-25* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-25* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *31 December 2001* is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1.   The disclosure is objected to because of the following informalities:

a.   The word, "the" in the phrase, "…display screen pixels that represent the each

primitive…" should be omitted (see page 3, lines 11-13).

Appropriate correction is required.

Drawings

2.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they .

include the following reference sign(s) not mentioned in the description: #138, 142, 144, 146 and

158 of Figure 2 and #170 of Figure 4. A proposed drawing correction, corrected drawings, or

amendment to the specification to add the reference sign(s) in the description, are required in

reply to the Office action to avoid abandonment of the application. The objection to the drawings

will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1, 2, 4, 6-8, 10-12, 14, 16-18, 20-22 and 24 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Liu et al. (U.S. Patent 6,144,387) in view of Smith et al. (U.S. Patent

6,424,345 B1).

In reference to claims 1, 11 and 21, Liu et al. discloses a rendering method and system for

image clipping of a display image area in a guard memory region (see column 3, lines 10-24 and

Figures 6 and 7). Liu et al. discloses determining object-zone intersections for objects in a scene

by determining the intersections of object vertices in comparison to clipping and guard memory

regions (see Figure 6). Liu et al. discloses defining a visible region using a first rectangle as a

display image area in guard memory (see #410 of Figures 5a & 5b). Note, the office interprets

the display image area defined with screen coordinates because the display image area is located

within guard memory which stores pixel data. Liu et al. also discloses the guard memory storing

a set of pixels of an image plane, arranged in a pixel array, which extends beyond the display

image area of the image plane (see column 3, lines 13-16, column 5, 19-25 and #510 of Figures

5a & 5b). Note, the office interprets the "second rectangle" of applicant's claims substantially

similar in functionality to the guard memory boundaries as the guard memory stores pixel data,

well known to comprise of color data (see column 1, lines 28-30), and effects the number of

clipping operations performed as the size or resolution of the memory is varied. Also note, the

office interprets applicant's "area threshold" substantially similar to the size of the guard

memory. Liu et al. discloses discarding objects completely outside the display image area as

projection #400d in Figure 5a is discarded and not shown in Figure 5b (see column 5, lines 30-

42). Note, the limitation of, "in one or more directions" is seen to be inherent to the clipping

method and apparatus of Liu et al. as Liu et al. explicitly discloses discarding projections located

entirely outside display image area (see column 5, lines 35-37). Liu et al. does not explicitly

disclose subjecting non-discarded objects to bin determination however Smith et al. does. Smith

et al. discloses a method for rendering polygons in a computer graphics system using clipping

and binning techniques (see lines 1-8 of abstract and #208 of Figure 3). Smith et al. also

discloses utilizing a, "binsorter" to identify which tiles, sub-regions of a display, are intersected

by an object by defining the determination region with a bounding box (see column 6, lines 10-

20 and Figure 7). It would have been obvious to one of ordinary skill in the art at the time the

invention was made to implement the rendering method and system of Liu et al. with the

clipping and binning techniques of Smith et al. in order to improve performance and reduce costs

of a 3-D graphics unit by allowing for the final processed image to be stored in a fixed region of

on-chip video memory, reducing memory access bandwidth and enabling the use of a

conventional display controller hardware (see columns 3, lines 32-37 and column 4, lines 28-40

of Smith et al.). Note, in reference to claim 11, Liu et al. also discloses a machine readable

medium having stored a plurality of instructions to execute the rendering methods as disclosed

above (see columns 7-8, lines 60-31). Smith et al. does not explicitly disclose instructions for

performing bin determination on non-discarded objects however, it is well known in the art that

graphics processing cannot be executed without some type of processing unit and instructions to

direct the processing unit on how to process the data (Official Notice). Further, some device

must be instructed to execute the processing of data in order for the "binning" of data into

specific sub-regions of memory to occur. Therefore, it would have been obvious to one of

ordinary skill in the art to implement instructions for performing the bin determination of Smith

et al. Note, in reference to claim 21, Liu et al. discloses performing the above disclosed

rendering techniques in a rendering system (see column 6, lines 27-33 and Figure 7).

In reference to claims 2, 12 and 22, Liu et al. and Smith et al. disclose all of the claim

limitations as applied to claims 1, 11 and 21 respectively above. Liu et al. discloses defining a

visible region using a first rectangle as a display image area in guard memory (see #410 of

Figures 5a & 5b).). Liu et al. also discloses the guard memory storing a set of pixels of an

image plane, arranged in a pixel array, which extends beyond the display image area of the

image plane (see column 3, lines 13-16, column 5, 19-25 and #510 of Figures 5a & 5b). Note,

the office interprets the "first rectangle" of applicant's claims to coincide with the area of a color

buffer because the guard memory stores pixel data, well known to comprise of color data (see

column 1, lines 28-30 of Liu et al.).

In reference to claims 4, 14 and 24, Liu et al. and Smith et al. disclose all of the claim

limitations as applied to claims 1, 11 and 21 respectively above. Neither Liu et al. nor Smith et

al. explicitly disclose rendering portions of the scene non-optimally when the buffer resolution

exceeds the threshold however, ideally, a video buffer is configured to store a just amount of data

so as to allow for peak optimal processing. Further, it is well known in the art that if a buffer

size is increased, more data is stored and processed, requiring more processing cycles and

resources to render the data (Official Notice). Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made to "non-optimally" render the scene

when the buffer resolution had exceeded the threshold.

In reference to claims 6 and 16, Liu et al. and Smith et al. disclose all of the claim

limitations as applied to claims 1 and 11 above in addition, Smith et al. discloses configuring the

processing of object information in tiles of the display based on a test from a bounding box

enclosing the object (see column 6, lines 21-28). Note, the office interprets Smith et al. to

disclose the buffer resolution, represented by the second rectangle, to be at or below the

threshold because the office interprets the second rectangle substantially similar to the rectangle

representing a portion of the display of Smith et al. (see column 6, lines 13-15 and Figure 7).

In reference to claims 7, 8, 17 and 18, Liu et al. and Smith et al. disclose all of the claim

limitations as applied to claims 1 and 11 above in addition, Smith et al. discloses aligning the

corner of the second rectangle to a zone and configuring the width of the second rectangle to be a

multiple of a zone width (see outer rectangle representing portion of display #50 of Figure 7).

Note, the office interprets Smith et al. to disclose the buffer resolution, represented by the second

rectangle, to be at or below the threshold because the office interprets the second rectangle

substantially similar to the rectangle representing a portion of the display of Smith et al. (see

column 6, lines 13-15 and Figure 7). Further, since the corners of the outer rectangle are aligned

with tile corners the office interprets the outer rectangle configured to be a multiple of a zone

width which the office interprets as being substantially similar to the threshold (see outer

rectangle of Figure 7 which is represented by 4 tile widths, #52a-d).

In reference to claims 10 and 20, Liu et al. and Smith et al. disclose all of the claim

limitations as applied to claims 1 and 11 respectively above. Although Smith et al. discloses the

zones to have the same size when first and second rectangles are not coinciding (see tiles 52a-p

of Figure 7), neither Liu et al. nor Smith et al. explicitly disclose configuring zones having a

same size when the first and second rectangles coincide. At the time the invention was made, it

would have been obvious to one of ordinary skill in the art to configure the sizes of the tiles of

Smith et al. to be the equal even when both rectangles coincide. Applicant has not disclosed that

configuring zones to have the same size when both buffer and display view representative

rectangles coincide provides an advantage, is used for a particular purpose, or solves a stated

problem. One of ordinary skill in the art, furthermore, would have expected Applicant's

invention to perform equally well with tile sizing configuration of Smith et al. because Smith et

al. discloses a second intersection processing stage where a more precise tile intersection process

is performed therefore, tiles of all the same size are not necessarily needed. Therefore, it would

have been obvious to one of ordinary skill in this art to modify Smith et al. to obtain the

invention as specified in claims 10 and 20.

4.   Claims 3, 13 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu

et al. (U.S. Patent 6,144,387), Smith et al. (U.S. Patent 6,424,345 B1) and further in view of

Callahan et al. (U.S. Patent 4,982,345).

In reference to claims 3, 13 and 23, Liu et al. and Smith et al. disclose all of the claim

limitations as applied to claims 1, 11 and 21 respectively above. Neither Liu et al. nor Smith et

al. explicitly disclose defining the first and second rectangles by state variables containing screen

space location of rectangle corners however Callahan et al. does. Callahan et al. discloses an

interactive computer graphics system for clipping an operator selected area of a display (see lines

1-27 of abstract). Callahan et al. discloses defining first and second rectangles representing two

viewport windows, used in clipping, by rectangle corner screen coordinate space variables (see

columns 5-6, lines 67-25 and Figure 3B). It would have been obvious to one of ordinary skill in

the art at the time the invention was made to implement the rectangle locating variables of

Callahan et al. with the rendering method and system of Liu et al. and the clipping and binning

techniques of Smith et al. in order to obtain the position of the rectangles in display device screen

space and correspond these positions to buffered screen space display data thereby making a

more efficient interactive graphics system (see columns 1-2, lines 64-2 of Callahan et al.).

5.   Claims 5, 9, 15, 19 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Liu et al. (U.S. Patent 6,144,387), Smith et al. (U.S. Patent 6,424,345 B1) and further in view of

Fliflet (U.S. Patent Application Publication 2002/0140710 A1).

In reference to claims 5, 15 and 25, Liu et al. and Smith et al. disclose all of the claim

limitations as applied to claims 4, 14 and 24 respectively above. Neither Liu et al. nor Smith et

al. explicitly disclose rendering zones larger than optimal zone size when the buffer resolution

exceeds a threshold however Fliflet does. Fliflet discloses a method for balancing workloads in

software and hardware associated with a zone renderer (see lines 1-2 of abstract) where the effect

of adjusting the size of a zone increases or decreases cache efficiency and processor workload

(see paragraph 38, last 4 lines). Fliflet also discloses the zone size capable of being adjusted

within a range between the cache size (minimum) and the screen size (maximum) (see paragraph

45, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to increase zone size to larger than optimal size when a buffer

resolution exceeds a threshold with the rendering method and system of Liu et al. and the

clipping and binning techniques of Smith et al. in order to compensate for the extra amount of

data which exceeds the buffer resolution threshold thereby greatly effecting optimal overall

system performance (see paragraph 38, lines 6-17 of Fliflet).

In reference to claims 9 and 19, Liu et al. and Smith et al. disclose all of the claim

limitations as applied to claims 1 and 11 respectively above. Neither Liu et al. nor Smith et al.

explicitly disclose extending zones along the edges of the second rectangle out to the first

rectangle boundaries to define zones larger than optimal zone size when the second rectangle is

smaller than the first. Fliflet discloses a method for balancing workloads in software and

hardware associated with a zone renderer (see lines 1-2 of abstract) where the size of a zone is

capable of being adjusted within a range between the cache size (minimum) and the screen size

(maximum) (see paragraph 45, lines 1-3). Further, when the second rectangle is smaller than the

first rectangle of applicant's claims, the buffer resolution has exceeded the threshold because

there is more data to be rendered than able to be rendered by the current size of the buffer.

Therefore, expanding zone sizes out to the edges of the first rectangle, disclosed by Fliflet to

greatly effect system performance (see paragraph 38, lines 6-17), would have been obvious to

one of ordinary skill in the art at the time the invention was made in order to compensate for the

extra amount of data which exceeds the buffer resolution threshold by also processing such

exceeded data. It would have been obvious to one of ordinary skill in the art at the time the

invention was made to adjust zone sizes to edges of a first rectangle when a second rectangle is

smaller than a first rectangle with the rendering method and system of Liu et al. and the clipping

and binning techniques of Smith et al. in order to compensate for the extra amount of data which

exceeds the buffer resolution threshold thereby greatly effecting optimal overall system

performance (see paragraph 38, lines 6-17 of Fliflet).

References Cited

6.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure:

a.   Kaso (U.S. Patent 5,850,475)

- Kaso discloses a method and apparatus for dividing an image area into plural rectangular subareas and boundary areas.

b.   Zhu et al. (U.S. Patent 6,344,852)

- Zhu et al. discloses a system and method implemented in hardware to optimize the binning of graphics data.

c.   Ludtke (U.S. Patent 6,377,276 B1)

- Ludtke discloses a method and apparatus for clipping a bitmap region corresponding to a logical intersection of a clipping region and a visible window.

d.   Baltaretu et al. (U.S. Patent 6,437,780 B1)

- Baltaretu et al. discloses a geometry tiler identifying tiles of a computer screen which are covered by a graphics primitive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Antonio Caschera whose telephone number is (703) 305-1391. The examiner can normally be reached Monday-Thursday and alternate Fridays between 7:00 AM and 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso, can be reached at (703)-305-3885.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

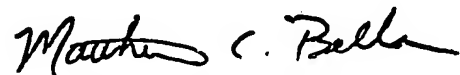Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,

Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the Technology Center 2600 Customer Service Office whose telephone

number is (703) 306-0377.

MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
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aac

9/16/03